The interaction of adjectival passive and voice

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Abstract: Adjectival passive participles typically denote states resulting from the events described by the corresponding active verbs. For a particular subclass of passive participles in Hebrew (the causative-template participles), the characterization of these states always implicitly includes the verb's external argument, even for verbs where the external argument is optional in the active voice. Such passive participles are thus parallel to passive verbs, which also obligatorily include implicit external arguments. Adjectival passive participles in other templates are parallel to middle-voice verbs, which do not include external arguments. This indicates that the structure of adjectival passives is specified for voice. Moreover, the voice specification of adjectival passives is determined by the non-active voice values available to the corresponding verbs.

keywords: Hebrew, Distributed Morphology, verbal template, *binyan*, root, passive participle, resultative participle, stative participle, target state, adjectival passive, middle voice, passive voice

1. Introduction

Passive participles are derived in Hebrew by the three different verbal templates of the language. The present study shows that there is a difference in syntactic structure between adjectival passive participles derived by the causative template and those derived by the other two templates. The difference stems from the different values of the non-active voice available in the three templates. As a result, the adjectival passive participle of the causative template has a richer structure from that of the other templates. In particular it projects the external argument, which the other templates do not.

Verb, noun and adjective stems in Semitic languages are derived from consonantal roots by different intercalations, called *templates*, of consonantal patterns, vowel sequences and affixes. While there are many templates which derive nouns from roots, the number of verbal templates, called *binyanim* in Hebrew grammatical tradition, is extremely limited. In Modern Hebrew, setting aside voice variation, each verb-stem is derived by one of exactly three templates. These templates, also found in Classical Hebrew and the other ancient Semitic languages (Akkadian, Aramaic, Arabic, Ge'ez), are traditionally known as (a) the *simple* template, (b) the *intensive* template, and (c) the *causative* template. Each verbal template derives, in addition to finite verbs, two participles, an active participle and a passive participle. The present study is concerned with the passive participle.

The passive participles of the three templates are introduced in section 2 of the paper. Section 3 shows that passive participles of all three templates can be categorized as adjectives in addition to their categorization as participial forms of verb. Section 4 discusses the difference between the interpretation adjectival passives of the simple and intensive templates and the richer interpretation of adjectival passives of the

causative template, the latter also including the verb's external argument. Section 5 reviews the verbal template system, and the syntactic derivation of verbs. Section 6 discusses the derivation of adjectival passives within this system, demonstrating that the minimal structure which derives adjectival passives in the simple and intensive templates is a middle-voice structure not including the verb's external argument, whereas the minimal structure which derives adjectival passives in the causative template is a passive-voice structure obligatorily including the verb's external argument. This difference is shown to be determined by the difference in the values which non-active voice can assume for the different verbal templates. Section 7 concludes the article.

2. The three passive participle templates of Hebrew

Example (1) below shows the three passive participles derived from the root *√sdr* 'order', and example (2) illustrates their adjectival use as noun modifiers. The subscript found with each passive participle (S/I/C) denotes the corresponding template (simple/ intensive/ causative) which derives it from the root:

(1) Adjectival passive participles derived from the root *√sdr* 'order'

a	**simple**	$sadur_S$	'ordered (in a configuration)'
b	**intensive**	$mesudar_I$	'arranged (tidy, orderly)'
c	**causative**	$musdar_C$	'settled (regulated, pre-arranged)'

(2)a zug **sadur**$_S$ b xéder **mesudar**$_I$ c heskem **musdar**$_C$
pair **ordered** room **arranged** agreement **settled**

'an ordered pair' 'a tidy room' 'a pre-arranged agreement'

The categorization of passive participles as adjectives is illustrated by their co-occurrence with the pronominal copula PRON (Doron 1983, 1986), which is not found with verbs:

(3) šaršéret ha-mazon b-a-téva hi $sdura_S$/ $mesudéret_I$/ $musdéret_C$
(the-)chain (of) the-food in-the-nature PRON ordered/orderly/regulated

'The chain of food in nature is ordered/orderly/regulated.'

An additional example is shown below of the three passive participles derived from the root *√kp* 'bend' in (4). Their adjectival distribution as noun-modifiers is illustrated in the examples in (5), found on the internet.

(4) Adjectival passive participles derived from the root *√kp* 'bend'

a	**simple**	$kapup_S$	'stooped, subordinate'
b	**intensive**	$mekupap_I$	'bent'
c	**causative**	$mukpap_C$	'subordinated'

(5)a gab **kapup**$_S$ hu lo gzera mi-šam-áyim
back **stooped** PRON not decree from-sky-DUAL

'A stooped back is not decreed by God.'

b gib'ol **mekupapI** dmuy-bérek
stalk **bent** like-knee

'a knee-shaped bent stalk'

c ha-yéda' hayom hu be-'ópen totáli **mukpapC**
the-knowledge today PRON in-manner total **subordinated**

l-a-nihul
to-the-administration

'Knowledge nowadays is totally subordinated to administation.'

A puzzling contrast in interpretation is found between the simple/ intensive adjectival passives in the examples above and the causative adjectival passives. The simple and intensive participles denote a state s holding of an individual x, which may or may not result from a previous event e, whereas the causative participle includes both quantification over an event e which brings about the state s, and over a participant y of e. y is understood as different from x, and thus the causative participle denotes a relation between two individuals. In the examples above, the state in (a) and (b) is not necessarily the result of an event of change, and, even if it is, this event does not necessarily involve an additional participant. In (c), the state is the result of an event including an additional participant.

We thus find in Hebrew a classification of adjectival passive participles which includes an additional class to the two classes recognized by Embick 2004. Embick distinguished among adjectival passives in English between stative and resultative participles. Stative participles describe basic states, and are directly derived from the root by an adjectival aspectual head Asp, without an intermediary verbalizing node. Resultative participles denote states that are results of the events which bring them about, and include a V node. An adjectival passive in English thus has one of two structures: [Asp √Root] or [Asp [V √Root]], corresponding to the stative and resultative readings respectively. For example, the adjectival passive *closed* can be constructed in two different ways, depending on whether it denotes a basic state, or the result state of an event of closing. In neither case is Voice, the verbal head which introduces external arguments, included in the derivation, therefore in neither structure is the external argument part of the interpretation of the adjectival participle (but see Anagnostopoulou 2003, Meltzer 2006, 2011 for a different view).

In Hebrew, stative and resultative readings are found with each of the simple and intensive adjectival passives. But the situation is different for causative adjectival passives, though they too have two readings. One is the stative reading, similarly to the other adjectival passives. The other is the resultative reading; but in the case of causative participles, its structure is different from the resultative structure of the other adjectival passives, in that it obligatorily includes the external argument. In this article I would like to offer an account for this phenomenon. In particular, I start by showing in the next section that this property of causative participles is not due to their simply being participial forms of passive verbs. There exist causative adjectival passives, as

already demonstrated above, yet their resultative structure includes the external argument.

3. Adjectival vs. verbal passive participles

Adjectival passive participles can be distinguished in Hebrew from verbal passive participles (Doron 1999). This contrast is discussed in the present section. In subsequent sections, verbal passive participles will be set aside, since the puzzle which constitutes the topic of the paper relates to **adjectival** passive participles. The aim of this section is to show that the puzzling behaviour of causative passive participles is not an indication that they are only categorized as verbal.

Verbal passive participles form part of the verbal system of Hebrew. In general, to each active transitive verb there corresponds a non-active verb, but *non-active* does not necessarily mean *passive*. Non-active variants are often middle-voice verbs (as elaborated in section 5 of the paper). In principle, there are two non-active verbal templates, passive (PASS) and middle (MID), corresponding to each active (ACT) verbal template. Some active verbs have two corresponding non-active verbs, one in the passive template and the other in the middle template. Intensive-template verbs (INTNS) usually have both a passive and a middle corresponding verb. But other active verbs only correspond to a single non-active verb. Simple-template verbs (SIMPL) have a corresponding middle-voice verb but no passive verb. Causative-template verbs (CAUS), on the other hand, do not have a corresponding middle-voice verb, only a passive verb. This fact about causative verbs will turn out to be crucial for the solution to the puzzle formulated above.

We begin with examples in the simple template, where there is no corresponding passive verb, and in particular no participial forms of passive verbs. It follows that the simple template passive participle is adjectival only (A), not verbal (V). The only non-active verbal participle of such verbs is the middle-voice participle (SIMPL-MID-PART):

(6)a ha-šá'ar **sagur**$_S$ / nisgar
the-gate **closed** (A) / close-SIMPL-MID-PART (V)
'The gate is closed/ is closing.'

b ha-xalon **šabur**$_S$ / nišbar
the-window **broken** (A) / break-SIMPL-MID-PART (V)
'The window is broken/ is breaking.'

In the intensive and causative templates, each adjectival passive participle related to a transitive active verb is typically also categorized as a verbal passive participle, INTNS-PASS-PART and CAUS-PASS-PART respectively:

(7)a ha-mismak **mešuxzar**$_I$
the-document **reconstructed** (A)/reconstruct-INTNS-PASS-PART (V)
'The document is reconstructed (A)/ is being reconstructed.'

b ha-kise **muzaz**$_C$
the-chair **moved** (A) / move-CAUS-PASS-PART (V)
'The chair is moved (A) / is being moved.'

The distinction between verbal and adjectival passive participles holds for intensive and causative participles as well, though verbal and adjectival passives are homophonous. This can be demonstrated by inspecting environments which distinguish adjectival from verbal participles (Doron 1999). One is the future tense copula *yihye* 'will-be', which takes A but not V complements. The contrast is illustrated in (8) for the simple template examples where the adjectival and verbal participles have different forms. Only the adjectival participle appears in this environment. A verbal participle cannot appear there (rather, the verb would have to be temporally inflected):

(8) be-ša'a xameš ha-šá'ar yihye **sagur**$_S$ / * nisgar
at-hour five the-gate will-be **closed** (A)/ * close-SIMPL-MID-PART (V)
'At five the gate will be closed (A)/ will be closing.'

Similarly, the verb *nir'e* 'seem' and the aspectual verb *notar* 'remain' take A but not V complements:

(9) ha-šá'ar nir'e / notar **sagur**$_S$ / * nisgar
the-gate seems/ remains **closed** (A)/ *close-SIMPL-MID-PART (V)
'The gate seems/remains closed/ *closing.'

In the context of of *kbar* 'already' + temporal interval, adjectival and verbal participles are interpreted differently; an adjectival participle is interpreted as resultative, whereas a verbal participle is interpreted as progressive:

(10)a ha-šá'ar kbar **sagur**$_S$ 'éser daqot
the-gate already **closed** (A) ten minutes
'The gate has already been closed ten minutes.'

b ha-šá'ar kbar nisgar 'éser daqot
the-gate already close-SIMPL-MID-PART ten minutes
'The gate has already been in the process of closing ten minutes.'

These contexts also distinguish between homophonous verbal and adjectival participles like the ones in (7) above. Since these participles can appear in adjectival environments such as the complement of *remain*, *seem* and the future tense copula *yihye*, and receive a resultative interpretation in the context of *kbar* 'already' + temporal interval, in addition to the progressive interpretation, it follows that intensive and causative passive participles are adjectival in addition to being passive verbs:

(11) Intensive passive participle
a ha-mismak notar/ nir'e/ yihye **mešuxzar**$_I$
the-document remains/seems/will-be reconstructed (A)
'The document remains/seems/will-be reconstructed (A).'

b. ha-mismak **mešuxzar**$_I$
the-document **reconstructed** (A)/reconstruct-INTNS-PASS-PART (V)

kbar šbu'-áyim
already week-DUAL

'The document has been reconstructed (A)/ (V) two weeks.'

(12) Causative passive participle

a ha-kise notar/ nir'e/ yihye **muzaz**$_C$
the chair remains/seems/will-be **moved** (A)
'The chair remains/seems/will-be moved (i.e. in a different location).'

b. ha-kise **muzaz**$_C$ kbar éser daqot
the-chair **moved** (A)/ move-CAUS-PASS-PART (V) already ten minutes
'The chair has been moved (A)/(V) ten minutes. '

This section has shown that causative passive participles, as well as the other participles, can be categorized as adjectives. In subsequent sections, verbal passive participles will be set aside, and we will only be interested in adjectival passive participles.

4. The interpretation of passive participles

4.1 Stative passive participles

Having set aside verbal passive participles, we must also set aside adjectival passive participles which are **basic** adjectives. Though morphologically constructed with participial exponents, these basic adjectives are not understood as the result of a dynamic event, even when they corresponding to dynamic verbs. Following Embick (2004), I call these *stative* adjectival passives. Hebrew examples are given below in all three templates. Note that these participles mostly correspond to English non-participial adjectives, and that many denote individual-level properties. The examples listed in (13) are all derived from roots which also derive verbs:

(13)a S stative passive participles
hadur$_S$ 'elegant', ka'ur$_S$ 'ugly', xatub$_S$ 'slender', qabua'$_S$ 'permanent', xašub$_S$ 'important', šatuax$_S$ 'flat', 'akur$_S$ 'muddy', 'alub$_S$ 'miserable', 'acub$_S$ 'sad', barur$_S$ 'clear', atum$_S$ 'opaque', qalušS 'sparse', spur-im$_S$ 'few-pl', sabuk$_S$ 'entangled', sadur$_S$ 'ordered'

b I stative passive participles
mehudar$_I$ 'elegant', meku'ar$_I$ 'ugly', me'uxar$_I$ 'late', meluklak$_I$ 'dirty', mesurbal$_I$ 'clumsy', mesugal$_I$ 'able', mecuyan$_I$ 'excellent', meruxaq 'distant', mexuspas$_I$ 'rugged', metumtam$_I$ 'imbecile', meruvax$_I$ 'spacious', mešune$_I$ 'strange', meyuxad$_I$ 'special'

c C stative passive participles
muqdam$_C$ 'early', mulad$_C$ 'innate', mupšat$_C$ 'abstract', mubhaq$_C$ 'distinct', muplag$_C$ 'extreme', mupra'$_C$ 'deranged', mubxar$_C$ 'select', muxlat$_C$ 'total', mukan$_C$ 'ready', mušlam$_C$ 'perfect', mušxat$_C$ 'corrupt', murkav$_C$ 'complicated', mukšar$_C$ 'talented'

One indication for viewing participles such as the ones in (13) as basic adjectives not including any verbal component in their derivation is that they are incompatible with adverbs which modify events and can be used as modifiers of resultative participles, such as *biqpida* 'carefully', *berišul* 'carelessly', *bexipazon* 'hastily'. This type of test was suggested by Kratzer 1994.

(14)a * te'un **barur**$_S$ biqpida
argument **clear** carefully
* 'a carefully clear argument'

b * béged **meku'ar**$_S$ berišul
garment **ugly** carelessly
* 'a carelessly ugly garment'

c * pirxax **mupra'**$_S$ bexipazon
brat **deranged** hastily
* 'a hastily deranged brat'

Second, each of these participles is compatible with the claim that it denotes a state that has not been brought about by an event, but is a lifetime property. (15) illustrates this point:

(15)a ezor ha-yá'ar haya tamid **sabuk**$_S$ be-'ecim
(the-)area (of) the-forest was always **entangled** with-trees
'The forest area has always been entangled with trees.'

b ha-síax haze camax **meruxaq**$_I$ me-ha-gader
the-shrub this grew **distant** from-the-fence
'This shrub grew at a distance from the fence.'

c xataltul nolad **mukan**$_C$ l-a-xayim
kitten (is) born **ready** for-the-life
'A kitten is born ready for life.'

Moreover, many stative participles are derived from roots which do not derive matching verbs in the same template, if they derive verbs at all. Some roots only derive nouns and adjectives in addition to participles, and some uniquely derive participles and their nominalizations, and thus are clearly not constructed from verbs:

(16)

	Participle	**Equi-rooted lexical items (equi-templatic verbs do not exist)**
a	gašum$_S$ 'rainy'	géšem 'rain' N
	maluax$_S$ 'salty'	mélax 'salt' N
	garum$_S$ 'bony '	gérem 'bone' N
	xasud$_S$ 'pious'	xésed 'charity, grace' N
	xaruc$_S$ 'diligent'	xaricut 'diligence' N
b	memušqap$_I$ 'bespectacled'	mišqap-áyim 'glasses-DUAL' N
	mezuqan$_I$ 'bearded'	zaqan 'beard' N
	menumar$_I$ 'spotted'	namer 'leopard' N
	me'ušar$_I$ 'happy'	'ošer 'happiness' N
	memušma'$_I$ 'obedient'	šama' 'hear-SIMPL-ACT' V
c	mušlag$_C$ 'snowy'	šéleg 'snow' N
	mugaz$_C$ 'carbonated'	gaz 'gas' N

mudlaq$_C$ 'infected'	daléqet 'infection' N
mub̲tal$_C$ 'unemployed'	batel 'idle' A
mucaq$_C$ 'solid'	yacaq 'cast-SIMPL-ACT' V

Finally, the choice of template for many of these participles is arbitrary. There are many pairs of participles, some shown in (13), consisting of the same root with two different participial templates but no discernible meaning difference, such as *ka'ur*$_S$/*me*k̲*u'ar*$_I$ both meaning 'ugly', *ra*b̲*ua'*$_S$/ *meruba'*$_I$ both meaning 'square', *xacu*p̲$_S$/ *mexuca*p̲$_I$ both meaning 'impertinent', *hagun*$_S$/ *mehugan*$_I$ both meaning 'decent', *meturap*$_I$/ *mutrap*$_C$ both meaning 'nutty', etc.

This section discussed stative participles, which are basic adjectives not involving any verbal structure. These participles are irrelevant to the puzzle distinguishing causative from other participles, since the puzzle concerns participles which include an eventive component as part of their interpretation.

4.2 Resultative passive participles

Unlike the participles discussed in the previous section, there are participles whose meaning involves the existence of an event that brought about the state denoted by the participle. Such participles are typically compatible with the adverbs *biqpida* 'carefully' and *berišul* 'carelessly' which modify events, indicating that their structure includes V. Following Embick 2004 I call these *resultative* participles.

Resultative participles are the ones relevant to the puzzle formulated in section 2: whereas the external argument is not part of the structure of the simple/ intensive participles, it is in the case of causative participles. This contrast can only be found in the resultative interpretation of passive participles, where they denote states typically resulting from an event.[1]

4.2.1 Simple and intensive resultatives

We start by considering simple and intensive participles only:

(17)a S resultative passive participles
katub̲$_S$ 'written', qašur$_S$ 'tied', šab̲ur$_S$ 'broken', raxuc$_S$ 'washed', ap̲uy$_S$ 'baked', qanuy$_S$ 'bought', mak̲ur$_S$ 'sold', baduq$_S$ 'verified', daxuy$_S$ 'postponed', patur$_S$ 'solved', ak̲ul$_S$ 'eaten', la'us$_S$ 'chewed', laquax$_S$ 'taken', maxuc$_S$ 'smashed', manua'$_S$ 'prevented', matuax$_S$ 'tense', rap̲uy$_S$ 'loose', kap̲up$_S$ 'stooped', atum$_S$ 'sealed', paruc$_S$ 'breached', 'ark̲$_S$ 'organized', sagur$_S$ 'closed', patuax$_S$ 'open(ed)'

b I resultative passive participles
mesudar$_I$ 'arranged', mesuraq$_I$ 'combed', megulax$_I$ 'shaven', mexumam$_I$ 'heated', mequrar$_I$ 'cooled', meb̲ušal$_I$ 'cooked', mešulam$_I$ 'paid', meyuda'$_I$ 'informed', me'uman$_I$ 'trained', meyucar$_I$ 'manufactured', meturgam$_I$ 'translated', metuk̲nan$_I$ 'planned', mekup̲ap̲$_I$ 'bent', metuqan$_I$ 'corrected', meluk̲san$_I$ 'angled', mexudad$_I$ 'sharpened', mesubak̲$_I$ 'complicated', mep̲uzar$_I$ 'dispersed', mequšar$_I$ 'connected', me'uqal$_I$ 'curved', mesulsal$_I$ 'curled', mequba'$_I$ 'fixed', mexusan$_I$ 'immune'

Some of these participles also have a stative reading in addtion to the resultative one. But even the resultative reading, which entails a dynamic event, does not entail the existence of an additional participant within this event, unlike the case of passive verbs (Kratzer 2000). In each of the examples (18) – (22) below, the state is not claimed to have been brought about by an additional participant. In (18a), the boy could have combed himself, whereas the passive verb in (18b) entails that someone else combed him. In (19a), the air could have cooled on its own, as is explicitly stated in the attested sentence in (19c), but this is not possible with the passive verb in (19b), which entails that an external participant cooled the air. The same thing is shown for warming, registering, washing and dressing in (20) – (22).[2]

(18)a ha-yéled mesuraq$_{I}$
the boy (is) combed

b —/→ ha-yéled suraq
the boy comb-INTNS-PASS
'The boy was combed.'

(19)a avir mequrar$_{I}$
air cooled 'cooled air'

b —/→ ha-avir qurar
the air cool-INTNS-PASS
'The air was cooled.'

c beyn še ha-'ananim nepuxim o daqim, tamid medubar be-gušim
whether that the clouds (are) puffy or slim, always it-is-dealt with-blocks

šel avir **mequrar**$_{I}$. avir yaxol le-hitqarer be-'et še-hu mitromem
of air **cooled**. air can to-cool-INTNS-MID when that-it rises

'Whether the clouds are puffy or slim, one is always dealing with blocks of cooled air. Air may cool wile rising.'

(20)a avir mexumam$_{I}$
air warmed 'warmed air'

b —/→ ha-avir xumam
the air warm-INTNS-PASS
'The air was warmed.'

c cinor ze no'ad le-haknis l-a-manóa' avir conen yoter
hose this is-intended to-bring.in to-the-engine air cool more

me-xazit ha-rékeb ve-lo avir **mexumam**$_{I}$
from-(the-)front (of) the-car and-not air **warmed**

me-ezor ta- ha-manóa'
from-(the-)area (of) (the-)compartment (of) the-engine

'This hose is intended to bring into the engine cooler air from the front of the car and not warmed air from the area of the engine compartment.'

d be-imun 'im ximum ata **mexumam**$_I$ ve kašir le-metixot
in training with warm-up you (are) **warmed** and fit for-stretches

ve- tnu'ot xadot
and-movements sharp

'In training with a warm-up, one is warmed up and fit for stetches and sharp movements.'

(21) ha-talmid **rašum**$_S$ l-a-ši'ur
the student (is) **registered** for-the-class
(Doesn't mean he was registered by someone else)

(22) ha-yeladim **rexucim**$_S$ ve-**lebušim**$_S$ be-pijámot
the children (are) **washed** and **dressed** in pijamas
(Doesn't mean they were washed or dressed by someone else)

The attested examples in (23)-(26) below, collected from the internet, are examples where the events which bring about the states denoted by the passive participles typically do not involve an additional argument:

(23) **'aruk 'organized'**
ha méšeq ha-yisra'eli eyno **'aruk**$_S$ li-qlot et ha-mictarfim
the economy the-Israeli is-not **organized** to-absorb ACC the-joiners

ha-xadašim le-kóax ha-avoda b-a-šanim ha-ba'ot
the-new to-(the-)force (of) the-work in-the-years the-next

'The Israeli economy is not organized to absorb the new people joining the work force in the next years.'

(24) **paruc 'breached'**
txum ha-hipnóza b-a-árec **paruc**$_S$ laxalutin
(the-)area (of) the-hypnosis in-the-country (is) **breached** completely

ve-ap-exad lo mamaš mepaqé'ax 'al ha-'osqim b-o
and noone not really supervises on the-practicing at-it

'The field of hypnosis in the country is completely breached and noone really supervises its practitioners.'

(25) **katub 'written'**
katub$_S$ b-a-kokabim: taxazit šbu'it
written in-the-stars: horoscope weekly

'Written in the Stars: Weekly Horoscope'

(26) **qašur 'tied'**
ha-'ubar **qašur**$_S$ be-xével ha-tabur
the fetus (is) **tied** with the umbilical cord

'The fetus is tied with the umbilical cord.'

This section has argued that the verb's external argument is not part of the interpretation of resultative passive participles in the simple/ intensive templates.

4.2.2 Causative resultatives

We now consider resultative passive participles in the causative template:

(27) C resultative passive participles
musdar$_C$ 'arranged', muzaz$_C$ 'moved', muqpa$_C$ 'frozen', mumas$_C$ 'melted', murtax$_C$ 'boiled', musaq$_C$ 'heated', mupal$_C$ 'thrown down', mucab$_C$ 'posted', mudax$_C$ 'deposed', mu'ataq$_C$ 'moved, copied', mušbat$_C$ 'put on strike', mucat$_C$ 'ignited', mušxaz$_C$ 'sharpened', mukxad$_C$ 'extinct', mušmad$_C$ 'exterminated', muke$_C$ 'beaten', mupac$_C$ 'scattered', musat$_C$ 'incited', mušxat$_C$ 'ravaged', muxlat$_C$ 'decided', mukan$_C$ 'prepared', mušlam$_C$ 'completed', murkav$_C$ 'combined', mukšar$_C$ 'trained'

Here too we find some ambiguous participles, for example mukšar$_C$ 'trained', which is also listed among stative participles in section 4.1 with the meaning 'talented'. Focusing on resultative interpretations, causative participles are distinguished from simple and intensive participles in that they obligatorily include an additional participant in the causing event. in (28a) below, where modification with *biqpida* 'carefully' selects the resultative reading of the causative participle, it is understood that the athletes were trained by others rather than having trained on their own. This is not so for the intensive participle in (28b), where the athletes can be understood as having carefully trained on their own:

(28)a sporta'im **mukšar$_C$-im** biqpida
athletes **trained**-PL carefully
'carefully trained athletes'

b sporta'im **me'uman$_I$-im** biqpida
athletes **trained**-PL carefully
'carefully trained athletes'

In each of the examples (29) – (32) below, the causative participle involves an additional participant other than the holder of the state. In (29), the causative *dressed*, unlike the simple *dressed*, entails that the boy did not dress on his own. The same holds for the causative *separated, silenced, posted* in (30)-(32), contrasting with the corresponding simple/ intensive participles, which do not entail an additional participant. In this respect causative resultative participles are like the verbs illustrated in the last section, but they are demonstrably not verbs.

(29)a mulbaš$_C$ vs. labuš$_S$
dressed dressed

b ha-yéled mulbaš$_C$ → Someone else dressed him
the boy (is) dressed

b ha-yéled labuš$_S$ → He could have dressed by himself
the boy (is) dressed

(30)a muprad$_C$ vs. parud$_S$
separated separated

b zug muprad$_C$ → Someone/something separated them
couple separated
'a separated couple'

c zug parud$_S$ → They might have separated of their own accord
couple separated
'a separated couple'

(31) muštaq$_C$ vs. mešutaq$_I$
silenced paralyzed

(32)a mucab$_C$ vs. memune$_I$
posted appointed

b ha-mélek **mucab**$_C$ be-roš-ha-caba
the-king (is) **posted** at-(the-)head(of)the-army → Someone else posted him

c ha-mélek **memune**$_I$ 'al ha-caba
the-king (is) **appointed** over the-army → He probably appointed himself

Surprisingly, this is also true for causative participles derived from verbs (many of which are deadjectival), where the external argument is optional. These are verbs where both the causative and the anticausative have the same form, i.e. these verbs do not necessarily have an external argument in the active voice. Yet the passive participle entails such an argument:

(33)a. ha-se'ar hilbin
the-hair whitened-CAUS-ACT
'The hair whitened.' (possibly of itself)

b. se'ar **mulban**$_C$
hair **whitened**
'whitened hair' → someone/something whitened it
(not by itself)

(34)a. ha-xalab hexmic
the-milk turn-sour-CAUS-ACT
'The milk turned sour.' (possibly of itself)

b. xalab **muxmac**$_C$
milk **soured**

'soured milk' → someone/something turned it sour
(not by itself)

(35)a. ha-lexay-áyim he'edimu l-o
the-cheek-DUAL redden-CAUS-ACT to-him
'His cheeks reddened.' (possibly of themselves)

b. lexay-áyim **mu'adamot**$_C$
cheek-DUAL **reddened**
'reddened cheeks' → someone/something made them red
(not by themselves)

(36)a. ha-šqedim gadlu l-o
the-tonsils grow-SIMPL-ACT to-him
'His tonsils grew.' (possibly of themselves)

b. šqedim **mugdalim**$_C$
tonsils **enlarged**
'enlarged tonsils' → someone/something made them exceed the size
they would reach by themselves[3]

This section has shown that the verb's external argument is part of the interpretation of resultative passive participles in the causative template.[4]

5. The Root-Template System

5.1 The architecture of the verbal system

The asymmetry between simple/ intensive participles and causative participles derives from the architecture of the verbal template system of Hebrew. This system expresses two dimensions of meaning (Doron 2003, 2008). One is agency – the thematic role of the external argument. The marked templates (the causative and the intensive) express the thematic role of the verb's external argument: cause and agent respectively. The simple template functions as default and is neutral as to the external argument's role.[5]

The agency dimension of the template system is illustrated by the table below, where the different active templates are shown (in boldface) intertwined with the (originally Greek) root *√spg* 'sponge'.

(37) √spg 'sponge'

	Simple	Intensive	Causative
Active Voice	s**a**p**a**g 'absorb'	s**ipe**g 'dab, swab, dry by sponging up'	**hi**sp**i**g 'impregnate, make absorb'

The following sentences serve to demonstrate the agentive nature of the subject of the intensive verb in (38a) versus the causative nature of the subject of the causative verb in (38c). (38b) is ungrammatical since abstract entities, such as *his good education,* are not agentive; (38c) is grammatical since abstract entities can be causes.

(38)a aba **sipeg** be-matlit et micx-o ha-meyuza' šel ha-yeled
father dab-INTNS with-cloth ACC front-his the-sweaty of the-boy
'Father dried up the boy's sweaty forehead with a cloth.'

b * xinuk-o ha-tob **sipeg** et micx-o ha-meyuza' šel ha-yeled
education-his the good dab-INTNS ACC front-his the-sweaty of the-boy
'His good education dried up the boy's sweaty forehead.'

c xinuk-o ha-tob **hispig** et ha-yeled be-'arakim
education-his the good impregnate-CAUS ACC the-boy with-values
'His good education impregnated the boy with values.'

An additional example is constructed with the root *√šlt* 'control'. Verbs in Modern Hebrew are not exclusively derived from bare roots, but are sometimes derived from nouns or adjectives (Arad 2003). An example is the intensive verb within the table (39) below, which, though ultimately derived from the root *√šlt* 'control' like the simple and causative verbs in the same table, is not derived like the latter from the bare root, but rather indirectly, after the root has been categorized as a noun. The intensive verb is thus in fact derived from the noun *šélet* 'sign post':

(39) √šlt 'control'

	Simple	Intensive	Causative
Active Voice	šalat 'control'	šilet 'fit with sign posts'	hišlit 'impose'

The agentive nature of the subject of the intensive verb is illustrated by (40b), in contrast with the non agentive nature of the subject of the simple verb in (40a) (which is a stative verb, hence non agentive) and of the causative verb in (40c):

(40)a. xóser séder **šalat** b-a-rexobot
lack order control-SIMPL in-the-streets
'Disorder ruled the streets.'

b. * xóser séder **šilet** et ha-rexobot
disorder fit-with-sign-posts-INTNS ACC the-streets
'Disorder fitted the streets with sign posts.'

c. xóser séder **hišlit** páxad b-a-rexobot
lack order impose-CAUS fear in-the-streets
'Disorder imposed fear in the street.'

The agency dimension can be schematically summarized as in (41). The external argument of each verb is not the argument of the root but of a *little-v* head (Marantz 1984, Kratzer 1994 , Borer 2003, Alexiadou, Anagnostopoulou & Schäfer 2006) which assigns a thematic role depending on its syntactic environment: Agent in the environment of the agency head ι (normally realized as the morphological exponent INTNS, the intensive template), Cause in the environment of the agency head γ (normally morphologically realized as the CAUS template), and undetermined elsewhere:

(41)	*v*	*agency-head environment*	*denotation of v*	*default exponent of agency-head*
a.	*v*/ _ ι		λyλe[Agent(e,y)]	INTNS
b.	*v*/ _ γ		λyλe[Cause(e,y)]	CAUS
c.	*v*		λyλe[Agent/Caus (e,y)]	SIMPL

Beyond the three active templates, the rest of the verbal system expresses alternations of voice (diathesis). To each active template there correspond in principle two non-active templates: passive and middle. As already mentioned in section 3 above, some of the active templates only have a single non-active corresponding template, which accounts for the fact that the total number of Hebrew templates is only seven. Whereas intensive-template verbs have in general both a passive and a middle corresponding verb, simple-template verbs have a corresponding middle but no passive, and causative-template verbs – a passive but no middle. The non-active templates are illustrated in (42) and (43) below with the roots *√spg* 'sponge' and *√šlt* 'control' by respectively expanding the tables in (38) and (39) along the voice dimension. Note that there are also lexical gaps, e.g. there are no attested examples of an intensive passive verb derived from the root *√spg* 'sponge', for no apparent good reason.[6]

(42) √spg 'sponge'

Voice	Simple	Intensive	Causative
Active	sapag 'absorb'	sipeg 'dab, swab, sponge up'	hispig 'impregnate, make absorb'
Passive	---	---	huspag 'be impregnated, be made to absorb'
Middle	nispag 'be absorbed'	histapeg 'dab oneself'	---

(43) √šlt 'control, govern'

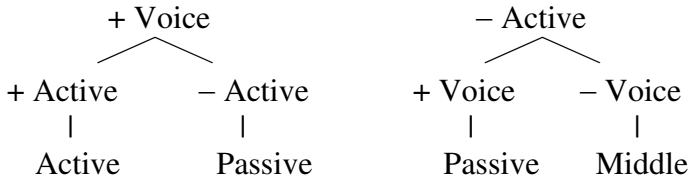
Voice	Simple	Intensive	Causative
Active	šalat 'control'	šilet 'fit with sign posts'	hišlit 'impose'
Passive	---	šulat 'be fitted with signposts'	hušlat 'be imposed'
Middle	nišlat 'be controlled'	hištalet 'impose oneself'	---

All verbs derived by the non-active templates are intransitive. But while the external argument can be totally obliterated in the derivation of the middle verb, it always implicitly participates in the derivation of the passive verb, and may be expressed explicitly as an *al-yedey* 'by' phrase. In middle voice verbs, the external argument is

often totally missing, but it may be implicit, or identified with the internal argument. This optionality gives rise to a variety of interpretations for the middle voice, which have been discussed in the typological literature (Klaiman 1991, Kemmer 1993). These interpretations are the ones found for the Hebrew middle templates as well: anticausative, reflexive/ reciprocal, medio-passive, dispositional, behavioral (Alexiadou & Doron 2012).[7]

Voice can be syntactically expressed as a feature [±Voice] of the head V which verbalizes the root: $V_{[+Voice]}$ is either active or non-active, whereas $V_{[-Voice]}$ is non-active. Thus passive verbs are classified with active verbs as [+Voice] and with middle verbs as non-active, ie [−Active]:

(44)



There are only three possible combinations of [±Active ±Voice], since [+Active] entails [+Voice]. These three combinations are encoded by the three-valued voice dimension of the template sytem. The exponent of $V_{[+Act+Voice]}$ is ACT, the active templates, the exponent of $V_{[-Act-Voice]}$ is MID, the middle templates, and the exponent of $V_{[-Act+Voice]}$ is PASS, the passive templates.[8]

The implicit external argument in the interpretation of resultative causative participles, in contrast to the lack of such argument in simple/ intensive participles, is reducible to the nature of the verbalizing head of the different templates. In the case of the verbalizing head of the causative template (the agency head γ), non active voice is realized as [−Active +Voice], a passive-voice head which always requires *v*, i.e. which always introduces an (implicit) external argument. In the case of the verbalizing head V of the other templates, non active voice can be realized as [−Active −Voice], a middle-voice head which does not requires *v*, i.e. which does not introduce an external argument. This will be elaborated in section 6 below.

5.2 Sample verbal derivations

5.2.1 Simple and intensive templates

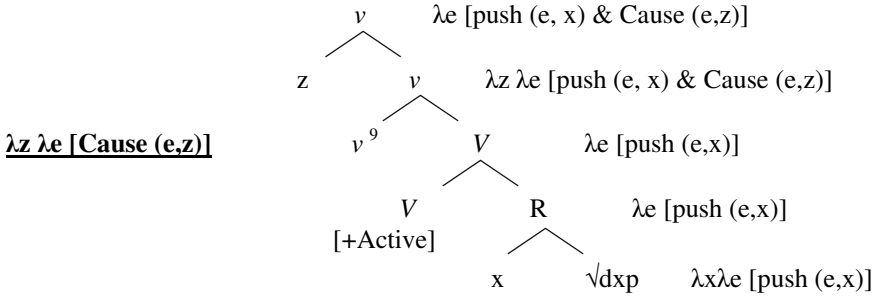
I assume the Distributed Morphology approach to word structure (following Halle & Marantz 1993, Hale & Keyser 1993, Marantz 1997 and subsequent work). I am also making the assumption that roots denote properties or relations of objects and eventualities (including events and states). In particular, this means that roots have arguments. For example, of the two arguments of the transitive verb *daxaf* 'push' in (45) below, one is the argument of the root √dxp (the "internal argument"), and the other (the "external argument") is a Cause argument introduced by the [+Active] voice. Similarly for the verb *'aqaf* 'overtake' in (46), where the external argument is an Agent.

The verbs in (45)-(47) are transitive verbs with no corresponding adjectival passives. These are verbs which do not entail the existence of a target state (Parsons 1990,

Kratzer 2000). Rather, the root relates an object x to a dynamic event e, with no specified target state. As argued in Doron 1999, a target state is a necessary condition for the derivation of adjectival passives in Hebrew. Thus these roots do not derive adjectival passives.

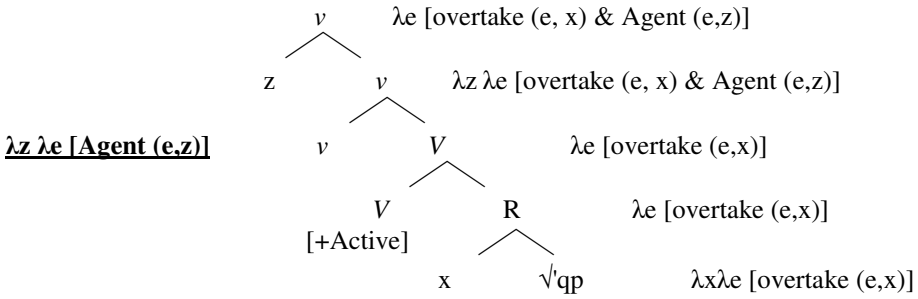
(45) **Simple Template**

z daxap et-x * daxup$_S$ 'pushed'
z push-SIMPL ACC-x
'z pushed x'



(46) **Simple Template**

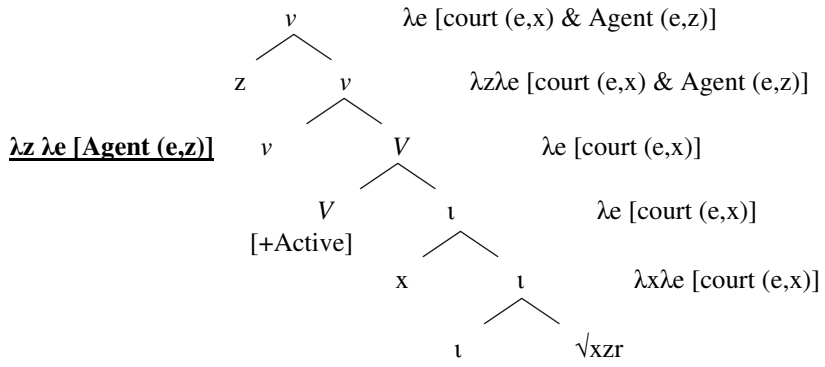
z 'aqap et-x * 'aqup$_S$ 'overtaken'
z overtake-SIMPL ACC-x
'z overtook x'



As argued in Doron 2003, intensive verbs are verbs where the root is modified by the agency head ι. Roots modified by ι only cooccur with *v* that introduces Agents rather than Causes. Modified roots not including a target state do not derive an adjectival passive, similarly to unmodified roots. Thus, the passive participle *mexuzar*$_I$ 'courted' corresponding to the verb *xizer* 'court' in (47) below only has a verbal passive interpretation (i.e. is only interpreted progressively) but no adjectival interpretation.

(47) **Intensive Template**

mexuzar$_I$ 'courted-INTNS-PASS-PART' (V)
z xizer axare-x * mexuzar$_I$ 'courted' (A)
z courted-INTNS after-x
'z courted x'



Verbs with a corresponding adjectival passive, such as the verbs in (48) – (51) below, are those verbs which have a target state as part of the interpretation of the root (or the root modifed by ι). There are two cases: one where the root is dynamic, yet, unlike the dynamic roots above, includes a target state, as in (48) – (49). These verbs will have a resultative but not a stative adjectival passive. Roots which are stative often allow the construction of stative in addition to resultative participles, as in (50) – (51).

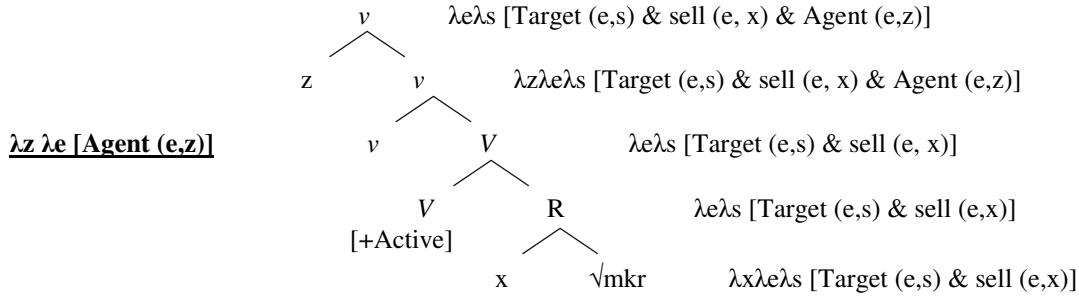
In examples (48) and (49), the dynamic event resulting in the target state is part of the root's interpretation. In such cases, the adjectival passive is resultative only:

(48) **Simple Template**

z makar et-x — makur$_S$ 'sold'

z sell-SIMPL ACC-x

'z sold x'



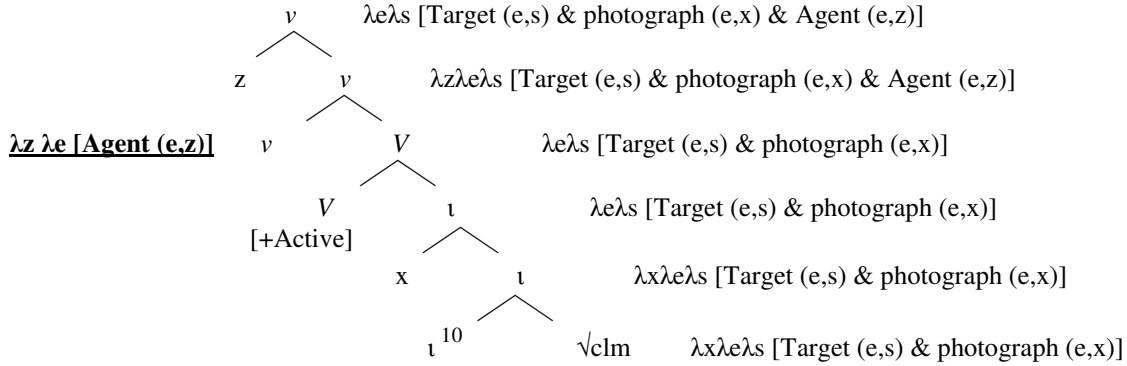
(49) **Intensive Template**

meculam$_I$ 'photographed'

z cilem et-x

z photograph-INTNS ACC-x

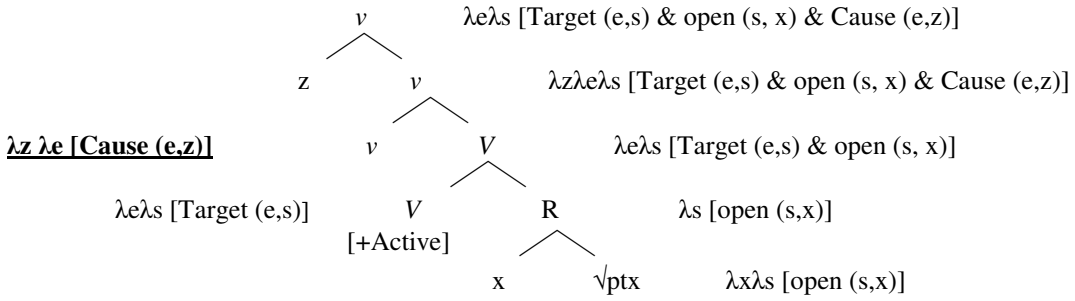
'z photographed x'



In contrast, in examples (50) – (51), the dynamic event resulting in the target state is not part of the interpretation of the root/ noun from which the verb is derived, but part of the verbalizing head V. In such cases, the adjectival passive does not necessarily entail the event, and in many examples has both a resultative and a stative interpretation.

(50) **Simple Template**

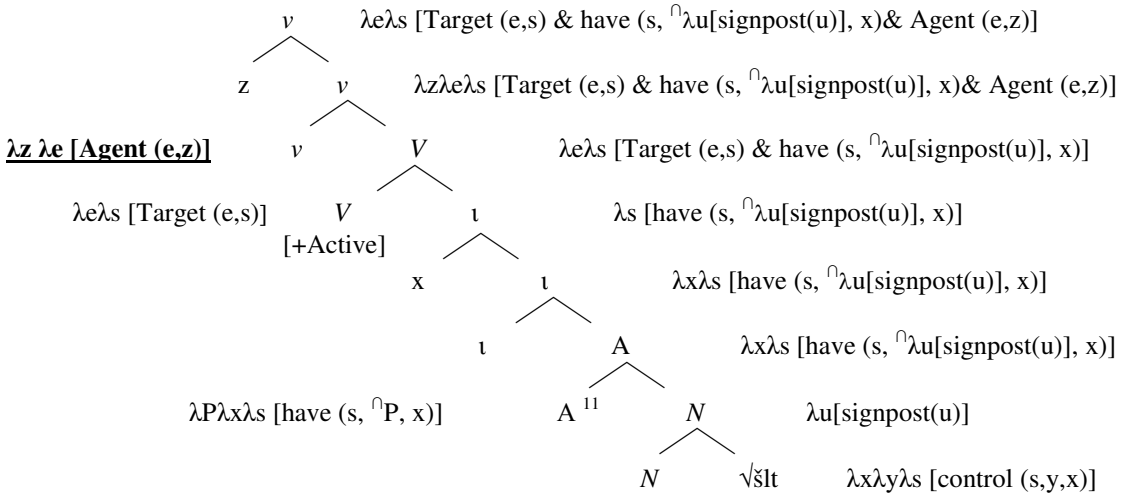
z patax et-x patuax$_S$ 'open(ed)'
z open-SIMPL ACC-x
'z opened x'



(51) **Intensive Template**

mešulat$_I$ 'has (been fitted with) signposts'

z šilet et-x
z fit-with-signposts-INTNS ACC-x
'z fitted x with signposts'

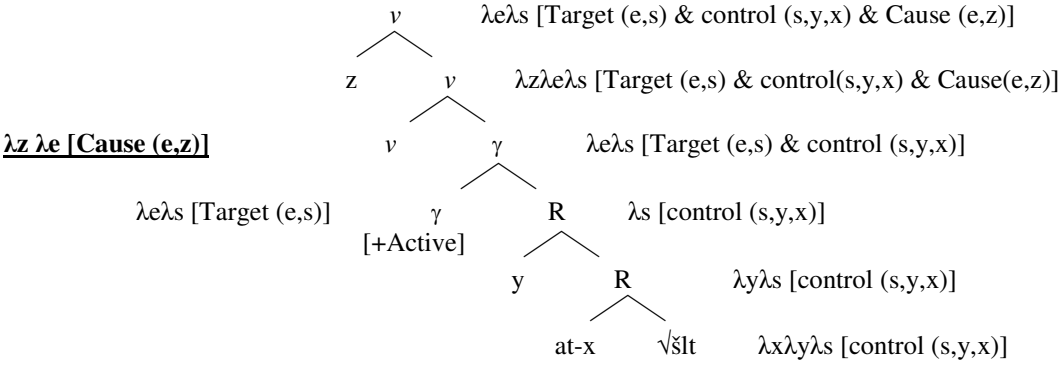


5.2.2 Causative templates

In causative verbs, the verbalizing head which combines with the root and its arguments is γ, typically realized by the exponent CAUS. As with the simple and intensive templates, if the root does not include a target state, no adjectival passive is derived. For example, the passive participle *munšam*$_C$ 'respirated' derived from the dynamic root *√nšm* 'breathe' only has a verbal passive interpretation (is only

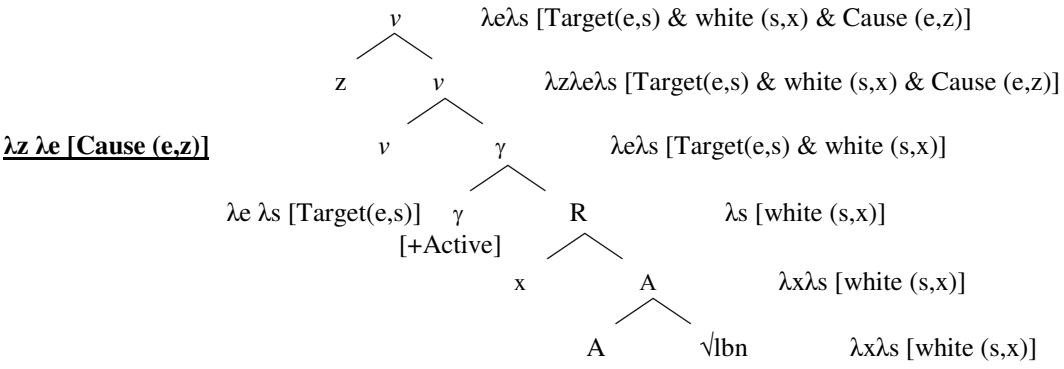
interpreted progressively) and does not have an adjectival interpretation. Dynamic roots which include a target state, like *√qny* 'buy', derive a resultative adjectival passive, in this case *muqne*$_C$ 'imparted', parallel to the simple resultative *qanuy*$_S$ 'bought'. An example with a stative root is shown in (52).

(52) **Causative Template**
z hišlit et-y be-x mušlat$_C$ 'imposed'
z impose-CAUS ACC-y at-x
'z imposed y on x'

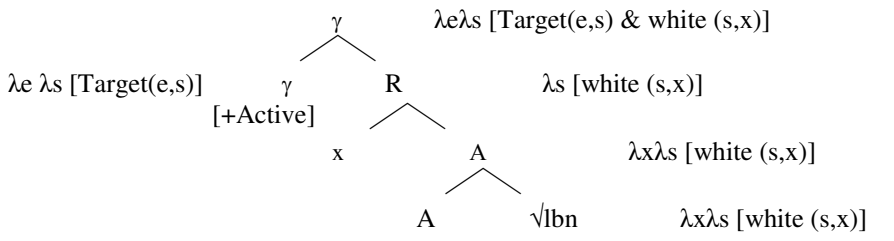


For some causative verbs (many of which are deadjectival), the external argument is optional . These are verbs where both the causative and the anticausative verbs, e.g. (53) and (54) respectively, have the same form.

(53) **Causative Template**
z hilbin et-x mulban$_C$ 'whitened'
z white-CAUS ACC-x
'z whitened x'



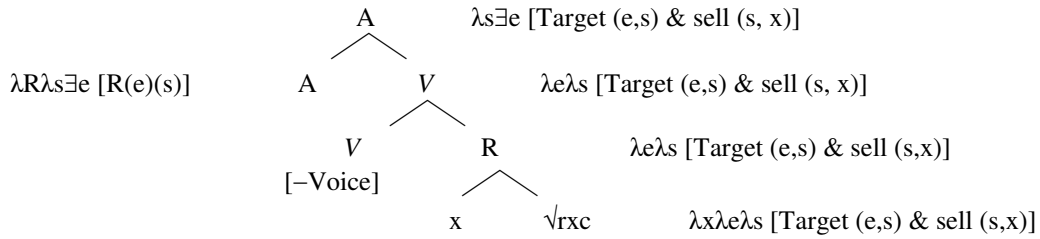
(54) **Causative Template**
x hilbin mulban$_C$ 'whitened'
x white-CAUS
'x whitened'



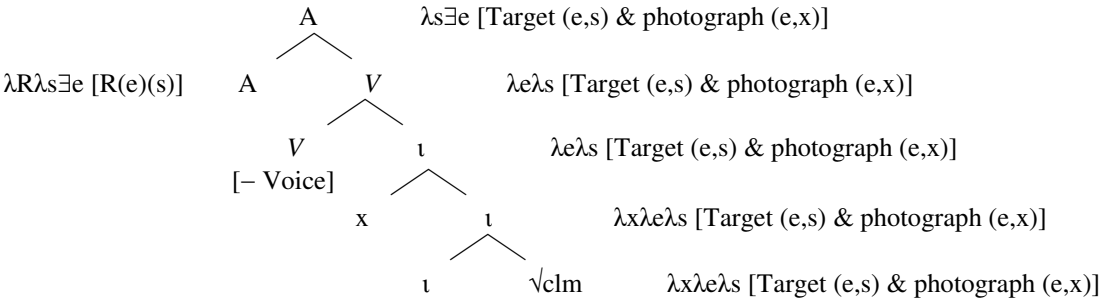
6. The derivation of adjectival passives

The adjectival passives corresponding to the simple/ intensive verbs in (48) – (51) above are shown below in (55) – (58). The passive participle structure is categorized as A. Semantically, A is interpreted as an aspectual operator existentially binding the event argument if there is one (Kratzer 2000). Dynamic roots only derive resultative participles, whereas roots denoting states may derive both stative and resultative participles.[12] Resultative participles are derived from the root by the minimal non active structure. Since both simple and intensive templates have a [−Voice −Active] template, this will be the structure derived. The corresponding structure with a [+Voice −Active] template would have an external argument in addition, and would not be the minimal structure. Thus, simple and intensive participles are derived without the merge of *v*, i.e. without the external argument found in the verbal derivation.

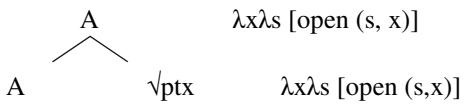
(55) Resultative participle only
x makur$_S$
'x (is) sold'



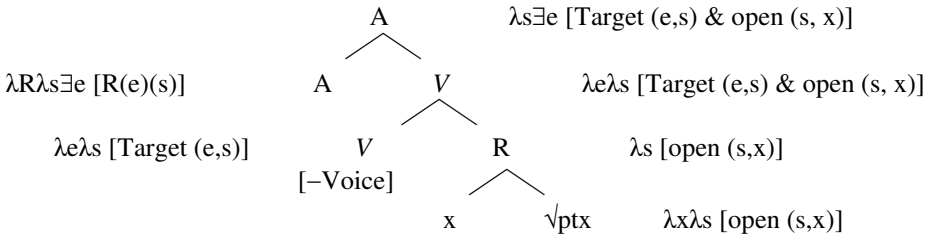
(56) Resultative participle only
x meculam$_I$
'x is photographed'



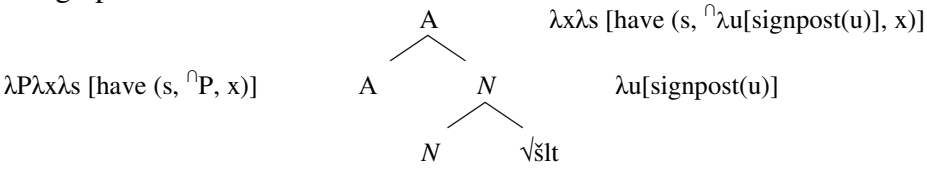
(57)a Stative participle
patuax$_S$
open



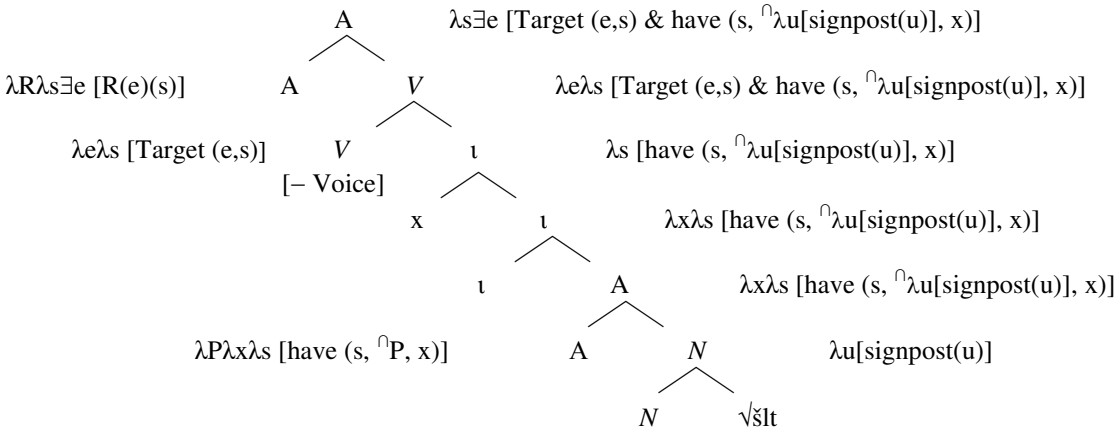
b Resultative participle
x patuax$_S$
'x (is) opened'



(58)a <u>Stative participle</u>
mešulat$_I$
has sign posts

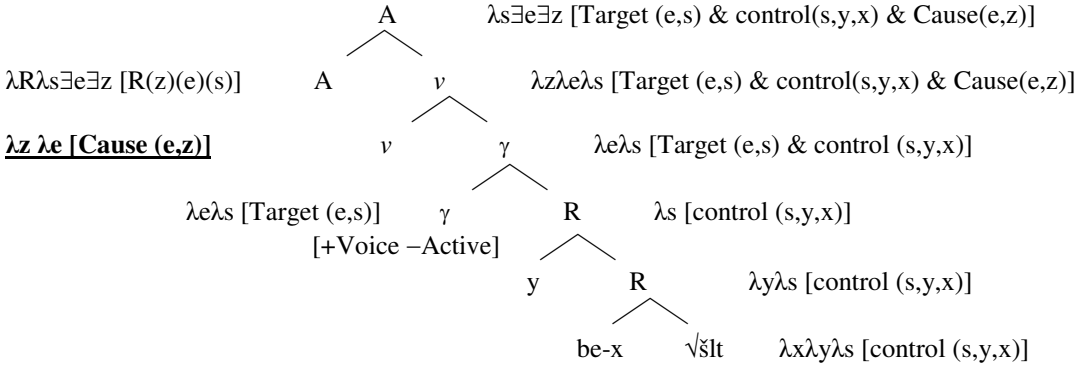


b <u>Resultative participle</u>
x mešulat$_I$
'x is fitted with sign posts'



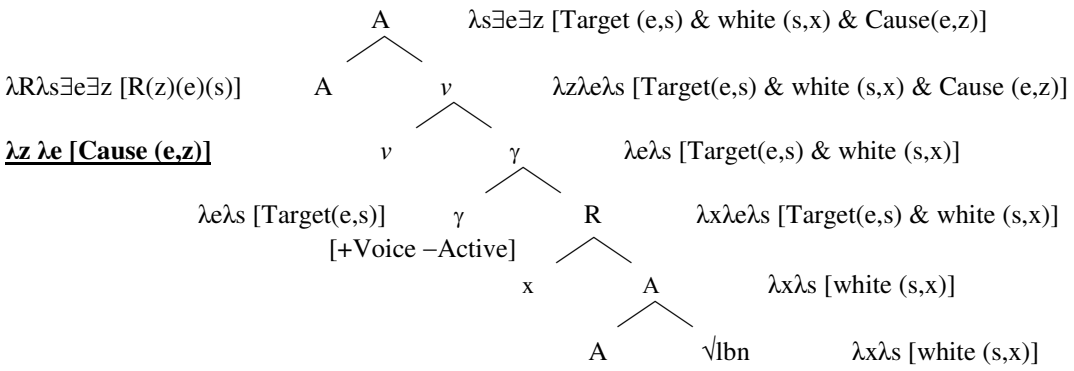
Turning to causative verbs, the verbalizing head γ is inherently [+Voice], since there is no middle voice in the causative template. As [+Voice−Active] requires *v* (i.e. the external argument is part of the structure of the passive voice), the external argument is obligatorily part of the derivation of the causative participle, as seen in (59):

(59) <u>Resultative participle</u>
y mušlat$_C$ be-x
'y (is) imposed on x'



Moreover, since [+Voice−Active] requires *v*, then the external argument is part of the derivation of the causative participle, whether or not it is part of the corresponding [+Voice+Active] verb. We thus account for the contrast between the active verb in (53) – (54) above, where the external argument is optional, and the resultative adjectival passive in (60) below, where it is obligatory:

(60) Resultative participle
x mulban$_C$
'x (is) whitened' (by an external cause)



7. Conclusion

Resultative passive participles derived by the causative template, unlike those derived by the simple or intensive template, always include in their interpretation existential quantification over the external argument of the corresponding active verb (even if the external argument is optional in the representation of the verb). This correlates with an additional distinction between the causative template and the other templates: whereas simple and intensive verbs have middle-voice forms, the only non-active form of causative-template verbs is the passive, a voice which obligatorily introduces an (implicit) external argument. The correlation between these two properties indicates that resultative participles are derived from their roots in a verbal structure which also includes the specification of voice. The simpler structures proposed by Kratzer 1994 and Embick 2004, which do not include a Voice head, cannot account for this correlation.

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[1] The distinction between stative and resultative interpretations is not detectable for adjectival passive participles corresponding to active verbs which are themselves stative, i.e. where the verb does not denote a dynamic event to begin with. In this case, the event bringing about the result state is itself a state, and is not distinguished from the result state. I will therefore leave aside in the text adjectival passive participles related to stative verbs. Such participles can be derived in all three templates, e.g. *xasum*$_S$ 'blocked', *me<u>k</u>utar*$_I$ 'surrounded', *mustar*$_C$ 'hidden', in parallel to their corresponding active verbs:

(i)a ha-sela' xosem et ha-knisa
the-rock blocks-SIMPL-ACT ACC the entrance

b ha-g<u>b</u>a'ot me<u>k</u>atrot et ha-'ir
the-hills surround-INTNS-ACT ACC the city

c ha-'ec mastir et ha-knisa
the-tree hides-CAUS-ACT ACC the entrance

Other examples of causative template passive participles derived from stative verbs are *mugdar* 'defined', *mugbal* 'limited', *mu<u>b</u>la'* 'concealed', *mu'arax* 'appreciated', *muncax* 'eternalized', *mugan* 'protected', *mu<u>b</u>an* 'understood', *mu<u>b</u>xan* 'distinct', *mutar* 'permitted', *mukar* 'familiar', *mu'ar* 'lighted'. These adjectives are relational, and thus include an additional argument. Therefore even if viewed as resultative, these causative participles fall under the generalization described in the article: causative passive participles include an argument in addition to the holder of the state.

[2] A reviewer reports finding the following sentences acceptable:

(i)a ha-yeled suraq 'al-yedey 'acmo
the-boy comb-INTNS-PASS by himself
'The boy was combed by himself.'

b ha-avir qurar 'al-yedey 'acmo
the-air cool- INTNS-PASS by himself
'The air was cooled by itself.'

I find these sentences ungrammatical, though they might slightly improve if *himself* is focused (cf. Doron and Rappaport Hovav 2009), as in the following example:

(ii) ?? ha-ni<u>b</u>xéret muyna lo 'al-yedey ha-me'amen 'ela 'al-yedey 'acma
the team.FEM sort-INTNS-PASS not by the-coach but by herself
'The team was sorted out not by the coach but by itself.'

In general, according to Baker, Johnson and Roberts 1989, there is an implicit argument in the morphology of passive verbs, which is interpreted as a generic or impersonal pronoun. Thus in (iiia), an impersonal "they" is said to have sorted the team. This is in contrast with (iiib), where the team is sorted out, maybe through a process of classification internal to the team:

(iii)a ha-nibxéret muyna
the team sort-INTNS-PASS
'The team was sorted out (V).'

b ha-nibxéret memuyenet$_{I}$
the team (is) sorted
'The team is sorted out (A).'

[3] There is group of adjectives like *mugdal*$_{C}$ 'enlarged': *muqtan*$_{C}$ 'reduced', *mugbar*$_{C}$ 'increased', *mu'ac*$_{C}$ 'accelerated', *murxab*$_{C}$ 'extended', *mu'arak*$_{C}$ 'elongated' etc, which mean "above-the-norm". These adjectives denote the target state of an event with an **external** cause responsible for this above-the-norm result. The event is not necessarily a dynamic event of change of over time, but of change from the expected to the actual value of a given dimension. It is reminiscent of the "derived stative" interpretation of adjectival passives discussed in Koontz-Garboden 2010, whereby events develop not in the temporal dimension but in a spatial dimension. Here the dimension of change is spatial in that it spans different specimens of a kind.

[4] There are resultative participles predicated of the active **subject** (Blau 1954, Doron 1999): *muclax*$_{C}$ 'successful', *mupnam*$_{C}$ 'introverted', *murvax*$_{C}$ 'has-gained', *mupsad*$_{C}$ 'has-lost', *mupla'*$_{C}$ 'mysterious', *qasum*$_{C}$ 'enchanted', *mumar*$_{C}$ 'convert'. Also *masur*$_{S}$ 'devoted', *mexušab*$_{I}$ 'calculated, *mesukan*$_{I}$ 'dangerous'. I leave aside these examples of voice reversal.

[5] Many roots derive singleton verbs, verbs which do not contrast with an equi-rooted verb in another template or with an equi-rooted noun/ adjective. There is no contrast associated with such roots, and no meaning emerges in these cases; the template is sometimes arbitrary, and often dictated by phonological considerations. But though not every verb in the causative template is causative, it is nevertheless the case that in every alternating pair of equi-rooted verbs, it is the causative-template verb which is the causative counterpart of the simple-template verb, and this is never reversed. Equally, every intensive-template verb alternating with an equi-rooted simple-template verb is agentive, and this is never reversed. Thus, the verbal template system expresses meaning where there is contrast.

[6] The meaning of the unattested intensive passive verb is expressed by the causative passive verb; the following is an attested example. Even in the active voice, the causative verb is sometimes used instead of the intensive verb, which is considered literary.

(i) kétem ha-soler 'al ha-kbiš **huspag** be-xómer meyuxad$_{I}$
(the-)stain (of) the-fuel on the road dab-CAUS-PASS with-substance special
'The fuel stain on the road was dabbed with a special substance.'

[7] It has been claimed that the template system also marks aspectuality, since in some cases, middle verbs are the inchoative (punctual) counterpart of unbounded (atelic) active verbs, e.g. *hityašev* 'sit-down.MID' vs. *yašav* 'sit.ACT' (Arad 2005, Schwarzwald 2008). I do not believe the system marks aspectuality, as the aspectual contrast is reversed in other examples, where it is the active verb which is punctual, and the middle verb – atelic, e.g., *halak* 'leave.ACT' (also 'walk') vs. *hithalek* 'walk-around.MID', *xala* 'fall-ill.ACT' vs. *hitxala* 'pretend-to-be-ill.MID', *yabaš* 'turn-dry.ACT' vs. *hityabeš* 'be-in-the process-of-drying.MID' (also 'turn-dry'), *exer* 'arrive-late.ACT' (also 'be-late') vs. *hit'axer* 'be-late.MID'; or both are atelic e.g. samak 'rely.ACT' and histamek 'base-oneself.MID'; or both puctual e.g. 'acar 'stop.ACT' and ne'ecar 'stop.MID'. Thus, aspectual contrasts vary in their direction, if at all present, and are reducible to contrasts in agentivity and in general to the thematic distinctions expressed by the template system.

[8] In previous work, I have used the notation μ for $V_{[-Act-Voice]}$, the middle-voice head, and the notation π for $V_{[-Act+Voice]}$, the passive-voice head.

[9] Following Kratzer, functional heads do not combine with their complements by the usual mode of function application, but by a different mode she calls "identification". For example, identification takes place in (45) in the subtree where *v* and V are combined, by applying λPλzλe[*v*(e,z) & P(e)] to the denotation of V.

[10] In order not to complicate the verbal structures, the interpretation λe[Action (e)] of the agency head ι is left out in subsequent structures. The effect of ι on the structure is here reduced to its cooccurrence with *v* that introduces Agents rather than Causes.

[11] As shown in Doron (2003), the intensive and causative agency heads ι and γ have canonical interpretations when combined with nominalized roots. Intensive template verbs are canonically interpreted as verbs of putting, i.e. an action resulting in x having N, and thus they include the property A: "having N" derived from N. The symbol $^{\cap}$ denotes the nominalization type shift mapping a property denoted by N to its individual (kind) correlate (cf. Chierchia 1984). In the denotion of *N*, "signpost" is shorthand for "instrument of control" derived by applying the nominalizing head *N* (interpreted as the "instrument" type-shift) to the denotation R of the root $\lambda x^n \lambda e$[control(e,x^n)]. I assume "instrument" to be defined as $\lambda R \lambda u \exists x^n \exists e$ [instrument(e, u) & R(e,x^n)].

[12] A state denotation of the root is not a sufficient condition for the existence of a stative passive participle. There is no such participle corresponding to (59) below, as a matter of lexical gap, nor to (60), where it is blocked by the basic adjective *la<u>b</u>an* 'white'. Moreover, since stative participles are directly derived from the root without the mediation of an agency-head, the contrast in participial exponent between S/ I/ C participles is often arbitrary, as was shown in section 4.1.